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AMERICAN POTATO JOURNAL

PUBLISHED BY

THE POTATO ASSOCIATION OF AMERICA

EAST LANSING, MICHIGAN

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Seed Treatment of Potatoes in New York State

M. F. BARRUS, Cornell University, Ithaca, N. Y.

The practice of treating seed potatoes is well established in New York State, especially in the central and western sections. The practice has been in use for many years but has increased greatly in recent times. Formerly, the cold formaldehyde and cold corrosive sublimate methods were employed exclusively but in recent years the use of mercury compounds has largely supplanted formaldehyde as a treating material. This is largely because experiments indicated that corrosive sublimate is more effective than formaldehyde in destroying the sclerotia of Rhizoctonia. Recent experiments, however, seem to indicate that formaldehyde is more effective than mercury compounds in the control of scab where this disease is a factor of importance but that neither can be depended on for the control of this disease in scab-infested soil.

With the development of the hot corrosive sublimate treatment, several New York State county agents have organized a seed treating project in their counties, whereby a Farm Bureau seed treating tank is moved from one community to another where growers have signed up to have a thousand or more bushels of seed potatoes treated. A schedule is prepared and on the day or days that the outfit is set up at given point, the farmers who have arranged for the treatment haul their potatoes to this place, have them treated, and take them home. A charge for treating is made on the basis of actual cost. From the table below one can obtain an idea of the extent to which this service is used, the quantity that can be treated in one day, and the cost of treatment. In general, the results have been very satisfactory and many growers have, because of

this service, planted treated seed who would not otherwise have done so.

Hot Corrosive Sublimate Treatment of Seed Potatoes in New York State in 1931

County	No. Farmers	No. Bushels	Average No. Bushels Treated per Day	Average Cost of Treatment Cents per Bushel
Allegany	143	8,818	800.0	5.00
Cayuga	155	8,739	759.9	6.00
Genesee	298	38,784	1,491.0	4.69
Livingston	61	5,693	711.6	7.00
Madison (private)	3	4,000		
Monroe	315	30,135	1,883.0	5.02
Onondaga	127	11,808	1,476.0	5.01
Orleans	25	4,500		
Oswego	133	5,310	1,060.0	4.01
Tompkins	32	2,219	1,109.0	4.75
Wyoming	88	7,862	786.0	7.00
Wyoming (private)		5,700		
Total	1380	133,568		

Within the past three years, the instantaneous dip method of treating seed potatoes with mercury compounds has come into practice and its use is being extended each year. This is due, in part, to the introduction of commercial organic mercury products for this purpose and, in part, to the research work with the use of calomel and of yellow oxide of mercury in instantaeous dips initiated by Doctor F. M. Blodgett and conducted under his direction. In reality the calomel treatment includes the use of corrosive sublimate, the required amount of the former being added to a 1-1000 solution of the latter. The yellow oxide of mercury was used in tests because of its slightly greater solubility in water than calomel and because it is easier to keep in suspension. Since its effectiveness has been proved, it is largely supplementing calomel for this method of treatment. The table below indicates the extent to which the various treatments have been used during the past three seasons in New York State.

Treatment	1931		1930		1929	
	No. Farmers	No. Bushels	No. Farmers	No. Bushels	No. Farmers	No. Bushels
Hot corrosive sublimate	1,380	133,768	1,449	114,895	1,402	130,588
Cold corrosive sublimate	1,589	78,675	657	30,400		53,150
Hot formaldehyde	2	7,100				
Cold formaldehyde	40	1,200				
Yellow oxide of mercury	642	82,740	57	5,590		
Calomel	192	14,135	278	31,300		14,100
Semesan Bel	1,242	91,308	683	26,720		47,625
Total	5,087	408,926	3,124	208,905		245,463

The data for hot corrosive sublimate are accurate or very nearly so but, for the other treatments, the figures for number of bushels treated are estimates. No data have been obtained from many farmers who treat small quantities of potatoes.

Testing the Strength of Corrosive Sublimate Solution in the Treating of Seed Potatoes

O. F. WALKER, Science Instructor, Alba High School, Alba, Mich.

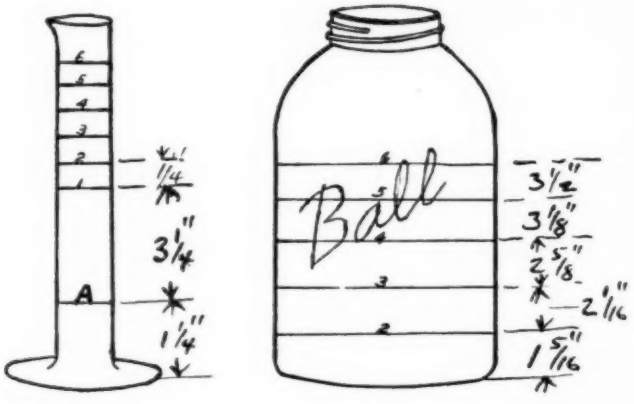
The Potassium Iodide test is a quantitative test that is of no practical value unless simplified so that farmers can make use of it. In this article, I shall outline the procedure of the test, and if further information is desired, I shall be glad to supply it.

The usual way of treating potatoes is to dissolve 4 oz. of corrosive sublimate in 30 gallons of water, then after treating a batch of potatoes, one oz. of corrosive sublimate is added until four or five batches have been treated, then the tank is emptied and the process started over again. This is a waste of time, and material, and then you don't know whether the solution is too strong or too weak.

By using the Potassium Iodide test, all of this is eliminated.

In carrying out this test, your treating solution is made as above, by adding 4 oz. of corrosive sublimate to 30 gallons of water. After treating a batch, you are ready to make the test.

In working this test, the first thing is to obtain (from a drug store) the testing solution which is prepared by adding 5 grams of Potassium Iodide and a very little Copper Sulphate to 1,000 cc. of water.



8" Test tube 7/8" dia.

The next step is to dissolve the corrosive sublimate in hot water. This, of course, should be done in glass or earthern jar. Dissolve 2 oz. in a quart of water—for in this proportion, it will stay in solution at quite low temperature. This will give you your stock solution.

In making the test after a batch of potatoes have been treated, I use a special-made measuring glass which is marked as shown above. After you have removed the potatoes, pour enough test solution into a measuring glass to read "a." Then take the treating solution and pour into a measuring glass until a uniform cloudiness appears which is usually red at first, but will change to a lighter color when the treating solution is dirty. (If the solution gets too dirty, you can filter, then test as before.) For example, the cloudiness appears at No. 3—then all one has to do is to pour from his stock solution enough corrosive sublimate to read '3" in the 2-quart jar. Then pour this into the tank and your treating solution is up to standard again. The same amount of water should be kept in the tank at all times, and should be added after the potatoes are removed and before testing. The measuring glass should be washed with water after each test.

I have tried testing treating mixtures for three years, and have found many advantages. First, it saves time, for you do not have to empty the tank, but can use a shovel to remove the sediment at the bottom of the tank. You can treat a batch every 35 minutes. Second, it saves money in that it takes less time and less corrosive sublimate. In treating 250 bushels of potatoes, it took about $3.00 less corrosive sublimate. There was no waste of corrosive sublimate by emptying the tank. Third, you do a much better job, for every potato is treated by the same standard solution, therefore, if the treating of potatoes helps control diseases, one certainly will get better results.

Potato Spacing, Fertilizer and Date of Planting Tests

J. J. Bird, Michigan State College, East Lansing, Mich.

Demonstration plots including the closer spacing of plants in the row, the use of a high analysis commercial fertilizer, and earlier planting were conducted in representative potato producing areas of Michigan during the seasons of 1930 and 1931. Spacings in the row of 12, 18 and 36 inches, commercial fertilizer at the rate of 500 pounds per acre using the analysis 4-16-8 when possible, and three dates of planting, May 15, June 1 and June 15 were used in this work. Russet Rurals were planted in practically all cases. A total of 163 plots were planted and harvested in 1931. Of the total number harvested during the two seasons, 79 were "Fertilizer and Spacing" and 57 were "Date of Planting," demonstrations.

The seasons of 1930 and 1931 were very unfavorable for potato production in Michigan. Each year July was about one and one-half inches below normal in rainfall. August 1930 had rainfall two inches below normal and in 1931 the August rainfall was nearly one inch below normal. Dry weather coupled with high temperature during July and August checked growth, resulting in low yields and the development of off-type potatoes. September of 1931 was wet and the off-type condition was particularly severe.

No attempt was made to select fields on the basis of soil type or fertility, though an effort was made to locate the demonstration plots with growers who would spray with bordeaux mixture and keep the plots free from hopperburn and

blights. Practically all plots were planted according to a definite standard and replicated twice. About one-eighth of an acre was used in each demonstration.

The plots were visited during the growing season by growers attending county potato tours and general meetings. Most of the plots visited showed the effects of commercial fertilizer in a more vigorous top growth easily apparent to the growers present, in spite of the fact that July and August of both seasons were such that very limited amounts of commercial fertilizer were made available to the plants. In 1931 those plots that showed no noticeable effects of fertilizer in the top growth during most of the growing season gave an increase in yield from the use of fertilizer. This was due largely to the exceptionally late growing season.

No Yield Reduction From Close Spacing in Drought Years

A large percentage of Michigan growers space too wide in the row, usually rowing both ways in the case of hand planting. The wide spacing allows the development of hollow heart in the Rural varieties during seasons of normal or above normal rainfall and does not result in the best yields. Hill spacing tests of 12, 18 and 36 inches were compared in 21 plots. In all tests the rows were 36 inches apart. Following are the spacing results of the 1930 and 1931 seasons:

Results of Hill Spacing Tests

	Yield per Acre U. S. No. 1 Bushels Spacings		
	12 in.	18 in.	36 in.
1930—14 plots	71	70	68
1931— 7 plots of 3 spacings	121	112	83
1931—65 plots of 2 spacings	141		114
Av. of standard plots	111		88.3

Because of the extreme drought during both seasons, hollow heart was not a factor. However, in a limited area in the northern part of the state where August and September rainfall was favorable for growth in 1931, the check rowed half of one plot was found to have approximately 20 per cent hollow heart and yielded less U. S. No. 1's than the close spaced half which showed no hollow heart. In very few cases was the 12-

inch hill spacing outyielded in U. S. No. 1's by either the 18 or 36-inch spaced plants.

During the five year period, 1926-1930 inclusive, close spaced plantings of from 12 to 18 inches resulted in an increase of 22 per cent of U. S. No. 1's over the check rowed plantings in experiments and demonstrations in Michigan. Eighteen wide spaced plots in 1926 and 1928 when rainfall was normal or above normal resulted in 16.3 per cent hollow heart, while the close spaced plots of the same year resulted in 3.6 per cent hollow heart. In 1931 actual yields from 50 foot rows of 12 and 36-inch spacings, were obtained from representative plots and exhibited at the district potato show.

Fertilizer Not Injurious During Drought

The commercial fertilizer demonstrations were planted in conjunction with the spacing plots each season. Although results were not up to the usual yield increase expected with the use of 500 pounds of 4-16-8 fertilizer, yet they were satisfactory under the circumstances.

The use of commercial fertilizer resulted in a 14 per cent increased yield for both seasons. Over a period of years the use of a high analysis fertilizer applied at the rate of 500 pounds per acre has resulted in approximately one and a half times this increase, seasonal differences being largely responsible for the variation.

It is thought by many growers that the average row application of fertilizer is injurious to potato plants during a dry, hot season, causing burning of the sprouts and poor stands. Growers who visited the fertilizer plots during the past two seasons were convinced that the use of commercial fertilizer when well mixed with the soil at planting time does not injure the stand. The more advanced and larger vine growth in some of the fertilized plots appeared more affected by the drought than did small growth in the unfertilized plots, a condition to be expected with a serious lack of moisture. However, the use of fertilizer resulted in increased yields in these cases.

Earlier Planting Favorable.—Dates of planting demonstrations were conducted with Russet Rurals to assist in advocating an earlier planting date generally throughout the state to avoid the usual high percentage of frost injured and immature stock. Eighteen of these plots were harvested in 1930 and 39 harvested in 1931. The largest portion of Michigan's table-stock is produced in the central and southern part of the state, where the recommended planting date is about June 1st. The three dates of planting used, May 15, June 1 and June 15, cover

the usual range of planting dates followed in this area, the majority planting nearer the middle of June.

The Yield results of the planting date demonstration of the past two seasons are presented in the following table:

Results of Date of Planting Tests

Date of Planting	Yield per Acre Bushels			
	1930 (18 Plots)		1931 (39 Plots)	
	Total	U. S. No. 1	Total	U. S. No. 1
May 15	120	89	191	125
June 1	114	83	178	121
June 15	92	64	154	119

The earlier planted potatoes outyielded the later plantings both seasons, despite the fact that those planted earlier necessarily remained in a dormant condition for a longer period throughout the drought than did those planted later. In the area seriously affected with internal brown spot in 1931, one plot showed spotting in relation to the date of planting, the earlier planted stock being most seriously affected. The remaining plots in this area showed no difference. In some cases, especially in central Michigan, the potatoes planted May 15 in 1931 proved to have a greater percentage of off-type tubers than did the June 15 plantings, but in practically all of these cases the total yield from the early planted plots was enough greater to allow a larger yield of U. S. No. 1's per acre than was produced from the late planted potatoes. Heavy rains in September, 1931, caused a high percentage of the crop to grow pointed, knobby and otherwise off-type.

The maturity factor was difficult to ascertain under the weather conditions of the past two seasons. In 1931, actual amounts dug from 50-foot rows of the May 15 and June 15 plantings in an area of the state which approached normal in growing conditions, were run over a power grader and sorter five hours after digging to observe differences in skinning injury. The late planted stock was by far the most seriously damaged, indicating a pronounced difference in degree of maturity. These lots were also used as demonstrations at the district potato shows in connection with the Michigan State College exhibit.

Work of this nature gives information concerning the production tendencies over a wide range of soil types and under varying weather conditions.

Crop and Market News

Potato Prices Down and Up

(Contribution from the Bureau of Agricultural Economics)

Weather conditions played an important part in the potato market during March and April. Supplies were light during early March and prices of old potatoes advanced to a relatively high level. However, during the week of March 13-19, carlot movement increased sharply to about 6,750 cars and prices then began to recede.

Early April reports indicated serious damage to the commercial crop in the South, resulting from the March freeze. Shipments of new stock were still light and forwardings of old stock had decreased to 4,800 cars during the second full week of April, with the result that prices were again advancing at nearly all shipping points. Movement of old potatoes was running one-fifth heavier than a year ago, thereby reflecting the one-third larger supplies remaining on the farms, as compared with last season's spring holdings.

Condition of the early potato crop in the South on April 1 was only 63% of normal, compared with 79% the year before. Lowest condition figures were reported for Florida, Alabama, Georgia, and South Carolina.

The April forecast of early potato production showed a commercial crop of about 1,690,000 bushels in Florida, or slightly less than half of last year's crop. Most of this decrease was in northern Florida where the March freeze did so much damage. The yield in Florida was expected to average only 78 bushels per acre. A yield of only 50 bushels per acre was indicated for the lower Rio Grande Valley of Texas, making the probable crop there 520,000 bushels, compared with 996,000 in 1931.

With new-crop shipments averaging only 70 cars daily from Texas and Florida together, during mid-April, the f. o. b. price of best Spaulding Rose potatoes in Hastings district of Florida reached $6 per barrel or $3.50 per 100-pound sack, and Bliss Triumphs in southern Texas had strengthened to about $2.75 per 100 pounds. This was in great contrast to the range of 50c-80c per 100 pounds in f. o. b. prices of old stock in the northern states. However, the level of 80c in western New York was distinctly higher than prices of the month before, while a range of 53c-55c in northern Maine was considerably lower than the mid-March level there. The North Central region as a whole had declined during late March and early April to an f. o. b. range of 55c-70c. Best sacked Russet Burbanks in the Yakima Valley of Washington were returning $12 per ton.

The Chicago carlot market on April 20th reported a range of 75c-80c per 100 pounds of northern Round Whites, with Red River Ohios at 80c-90c, Idaho Russets at $1.25-$1.30, and fine quality Nebraska Bliss Triumphs at $1.50-$1.60. The price level in Chicago was considerably lower than the month before, and the "futures" market had almost ceased to function, so far as late-April deliveries were concerned.

The jobbing range on Maine Green Mountains in eastern markets was 90c-$1.35 per 100 pounds, or only slightly more than in March. New Florida Spaulding Rose potatoes were selling at $7.25-$8 per barrel in large consuming centers. The 100-pound sacks of Texas Triumphs jobbed at $3.45-3.85. City prices of new potatoes were not much below those of a year ago, but old stock brought scarcely more than half of last spring's corresponding prices.

During the second week of April, about 4,800 cars of old potatoes were shipped, with Maine supplying 1,800, New York 200, the North Central States, 1,525, and Idaho 800 cars. Movement from the West was lighter than the year before, but practically all other states showed sharp increases over their records of April, 1931.

Total plantings of potatoes in the United States this year are expected to be scarcely 2% greater than the harvested acreage of last year, with most of the increase in the North Central States and the West. The commercial acreage in the second group of early states shows a 26% reduction from last spring, and reports of growers' intentions in the second-early group likewise indicate a cut of 26%, but five intermediate states may show a 2% increase.

Estimated Potato Shipments—Maine

The most important consideration in the country for the markets on old potatoes during the remainder of the season is the extent of the supplies left on hand in the state of Maine, and we were pleased indeed to recive recently a copy of the Bangor & Aroostook Railroad Co. inventory of the potatoes in their territory as of April 15th.

Carloads previously shipped	31,450
Estimated total shipments this season	39,348
Total shipments to same date last season	35,226
Total carloads delivered connections last year for complete shipping season	40,475

The territory served by the Bangor & Aroostook Railroad Co. usually ships approximately 75% of all of the potatoes from Maine, as will be noted by the 40,475 cars originated by this road last season, compared with the total state shipment of 53,381 cars. Calculated on this basis, the 7,898 cars on

hand April 15th at the B. & A. stations are equivalent to about 10,500 cars in the state as a whole. This compares with 6,812 cars shipped from Maine after April 15th last year.

The Maine marketing season lasts until July 1st, and the New England consuming territory usually buys comparatively few new potatoes until the Eastern Shore of Virginia comes on the market about the middle of June. The southern states that really compete with the old potatoes from Maine are Florida, South Carolina, Georgia and North Carolina. Last year, Florida shipped 5,400 cars after April 15th, South Caroline 5,029, Georgia 802 and North Carolina 8,677, or a total of 19,908 cars mostly between April 15th and July 1st. Besides this, Canada exported approximately 600 cars during late April and May to our markets.

The situation this season is that practically no Canadian potatoes can come to our markets at even close to present prices. Florida is not expected to ship more than another 1,500 cars. South Carolina will probably not harvest more than 2,500 cars, Georgia about 400, and North Carolina probably around 5,000 cars. This makes a total of only 9,400 cars of southern potatoes that will compete with Maines until Virginia comes on the stage. In other words, Maine has 10,000 cars fewer new potatoes to compete with this season than last year, and about 600 cars fewer Canadian potatoes, unless prices advance materially. Against this, we have only an estimated 3,500 additional cars in Maine as of April 15th, and only moderate additional supplies in New York, Pennsylvania and Michigan.

In the face of these facts, Maine potatoes are selling today in Boston at around 95c per cwt., or 55c per cwt., f. o. b., compared with $1.85-$1.90 in Boston a year ago and $1.45-$1.50 f. o. b. Regardless of business conditions, we feel that this situation is bound to start reflecting itself in price before the season is very much older. If and when eastern prices start advancing, the remaining Michigan holdings will be attracted farther east, the Wisconsin selling territory will be broadened, and all western markets will be stimulated.

—TABB POTATO SERVICE.

Notes

Studying Potato Storage Losses

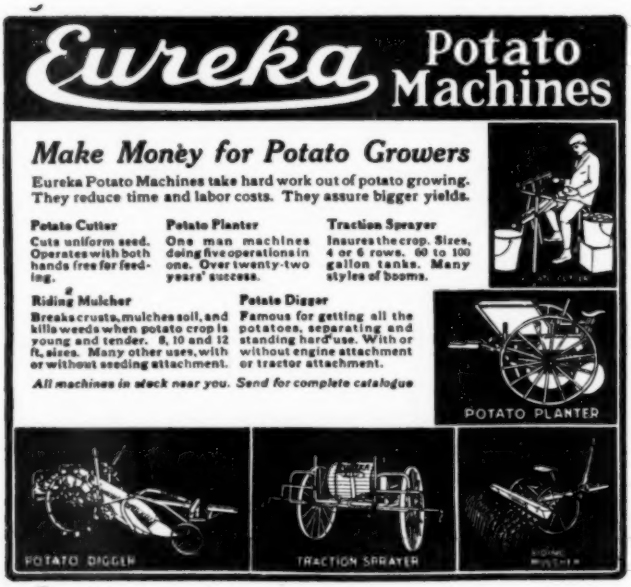
To determine economical types of storage spaces for white potatoes, and the value of ventilation and temperature control in reducing storage losses, the Bureau of Agricultural Engineering, U. S. Department of Agriculture, is making studies of

storage bins at the shipping station at Presque Isle, Me., and is collecting information on storage houses on individual farms.

Farmers often sustain losses in storing potatoes, especially in unfavorable seasons and in poorly constructed houses. Some of these losses are caused by diseases contracted during growing periods, but many are caused by improper conditions of temperature, moisture, air circulation, or handling of the potatoes in storage.

At Presque Isle, in several bins it is possible to control temperatures and to measure the moisture content of the air. Some bins have natural ventilation and others are equipped with blowers to determine the effects of drying the potatoes quickly after storing. The potatoes are weighed when put into the bins and when taken out, and their cooking quality is tested at intervals. The bureau is also collecting records of temperatures and other conditions in various types of storage houses on farms in the vicinity of Presque Isle.

On many farms the potato storage space is a hillside cellar, with room above for stowing machinery. The floor between is usually of rough-sawed boards, through which moisture from potatoes rises and condenses, during cold weather, on the under-side of roof and on machinery. When warm periods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come, moisture drips down, damaging both machinery and potatoes. Proper insulation of the floor and ventilation of the cellar would protect both machinery and potatoes, according to the engineers.

—U. S. Department of Agriculture.

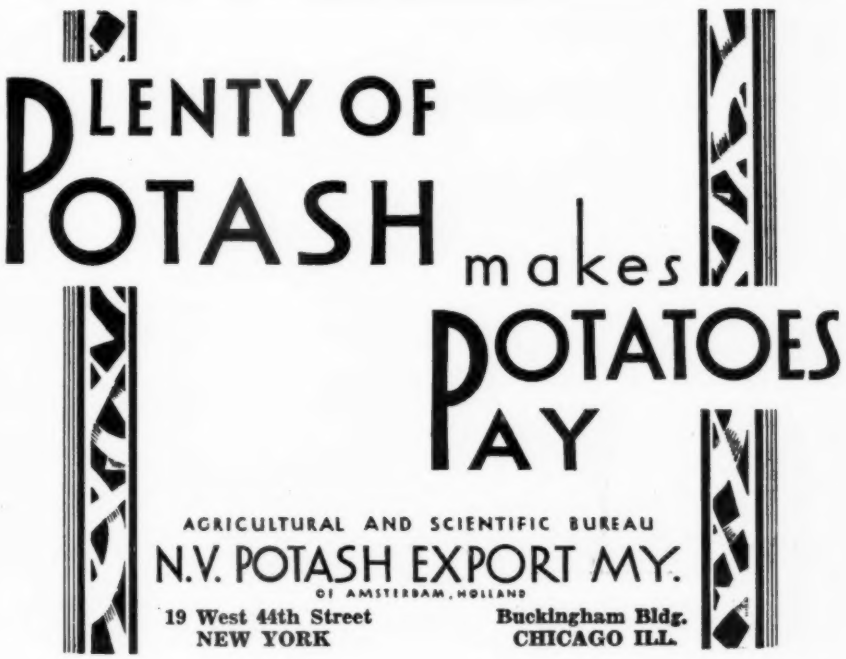
KANSAS

Notes of the 1932 Kaw Valley, Kansas, Potato Crop

The commercial potato acreage in the Kaw Valley, Kansas, for 1932 is approximately 11,000 acres, which is somewhat less than the acreage in 1931. Planting was delayed this spring because of cold weather during the week of March 21 and planting was from 10 days to two weeks later than in 1931.

Weather and soil conditions for planting were ideal this spring. During the first half of April, warm weather prevailed with little or no rain. The latter half of April was rainy and cooler and growth of the plants was consequently slowed down.

From a survey it was estimated that 75% of the crop in the valley was up by May 1 with the remaining plants just ready to break through the soil. Injurious frosts which delay the plants have been avoided so far. From this it is evident that the crop is very little later than normal even though the seed was planted late.



On May 1 the prospects are for a normal crop of potatoes for Kansas this year.

—O. H. ELMER.

Review of Recent Literature

Brown, J. G., and Streets, R. B. Seed Potatoes—Selection and Disinfection. Arizona Ext. Circ. 67. June 1931.

Seed potatoes used in Arizona are obtained as certified seed from other states, raised at home or bought in the form of table potatoes on the market. The authors urge that more attention is needed in respect to seed quality and say that good seed can be raised at the higher elevations in the home state. They recommend a seed plot for every grower and show how yields can be improved by developing strains either by the tuber-unit or the hill method of selection.

Most of the bulletin is devoted to a description of such tuber borne diseases as scab, rhizoctonia, and black leg and a discussion of their control by seed disinfection. Detailed directions for applying standard seed treatments are given. Among the treatments described are (1) the New Zealand 5-minute acidulated mercuric-chloride, (2) standard mercuric-chloride, (3) hot mercuric-chloride, (4) standard formaldehyde, (5) hot formaldehyde, and (6) organic mercury treatments.

Cutting seed, seed dormancy, seed storage, planting depth, and thiocyanate treatment to break the rest period are briefly discussed.

—E. V. HARDENBURG.

Gunn, R. V. Some Economic aspects of the Potato Situation. Michigan State College Extension Bul. 119, July 1931.

The bulletin is an attempt to present some of the important economic factors that may help farmers to plan a more profitable production and marketing program. The author calls attention to the fact that the potato acreage in Michigan has declined 20 per cent in the last ten years. Michigan, being a surplus potato state, the average farm price is lower than that for such deficit states as Ohio and lower in fact than that for the United States as a whole. Michigan has both a production and a marketing problem whereby it must attempt to compete on the quality basis with such states as Maine and Idaho. Carlot shipments are decreasing as truck movement increases. He pleads for better standardization of varieties, better market quality, and a better marketing program. Grower owned and controlled cooperatives are one of the solutions offered. About 20 per cent of Michigan's crop is now marketed by the Michigan Potato Growers' Exchange.

—E. V. HARDENBURG.